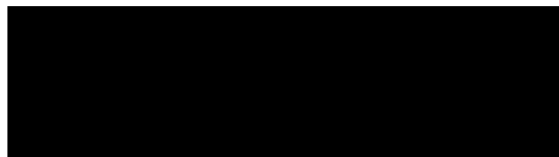


Quaternary Geomorphology Assignment

By:



GEOB 309

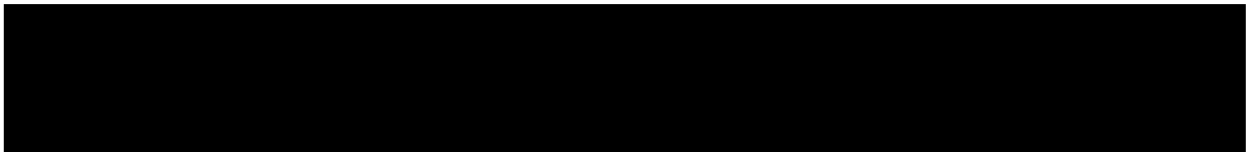


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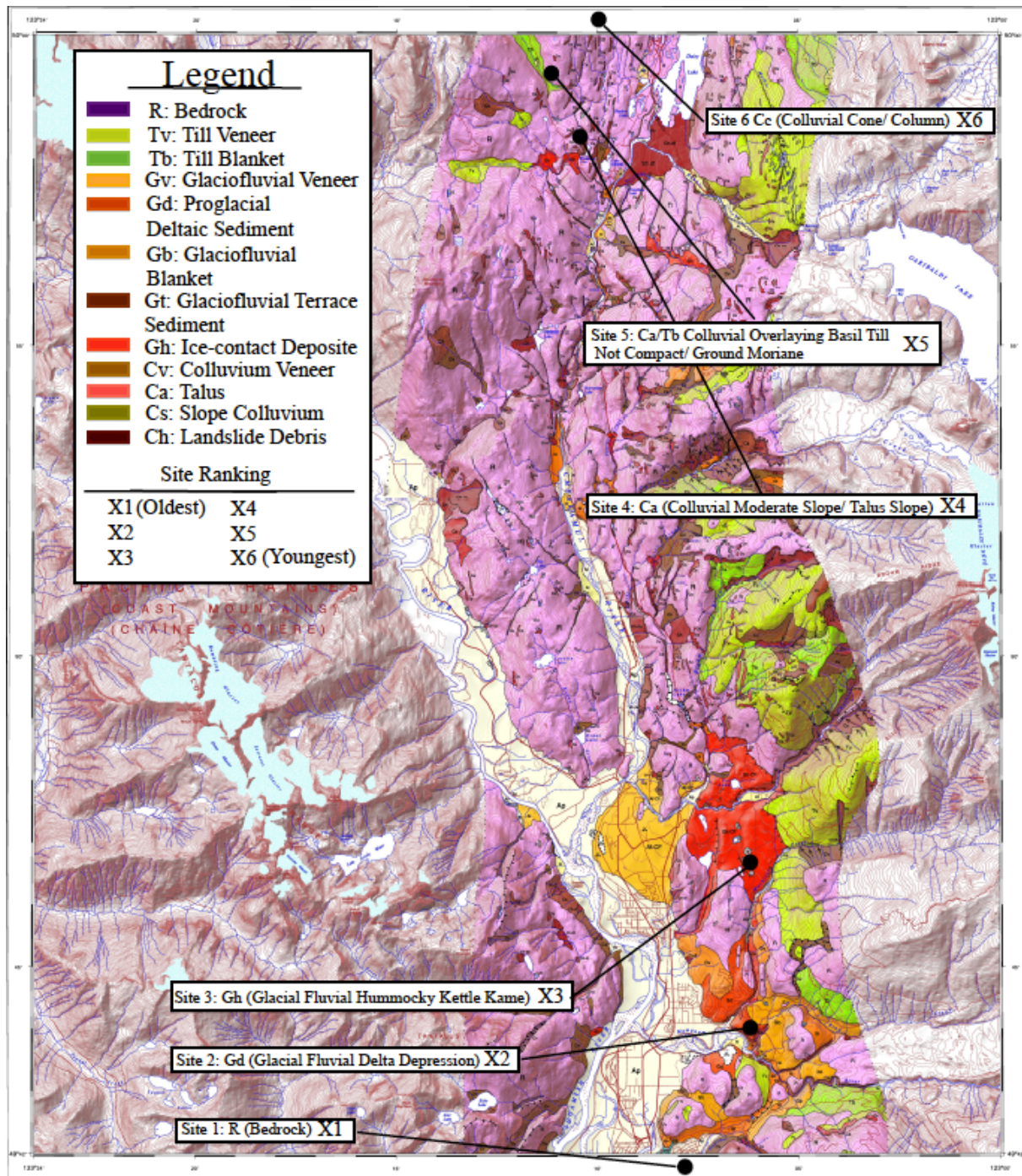
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1| Introduction

Back to the Pleistocene period, majority of Canada was covered by ice, which formed unique landforms of British Columbia. Those deposition and landforms play an important role for geomorphologists and scientists that are interested in the history of earth and environment, to record the sequence of event before, during, and after glaciation. This analysis is focuses on six sites of historical glaciation in the Squamish Valley and the Cheakamus Valley. We will explore the glaciation activities and volcanism activities within the six sites.

2| Annotated Geomorphic Map

Surficial Geology and Landslide Inventory Of The Middle Sea To Sky Corridor



Source: http://ftp.geogratis.gc.ca/pub/nrcan_rncan/publications/ess_sst/224/224963/gscof_5323_e_2008_mn01.pdf

3| Landform Sketches

3.1 Site 1

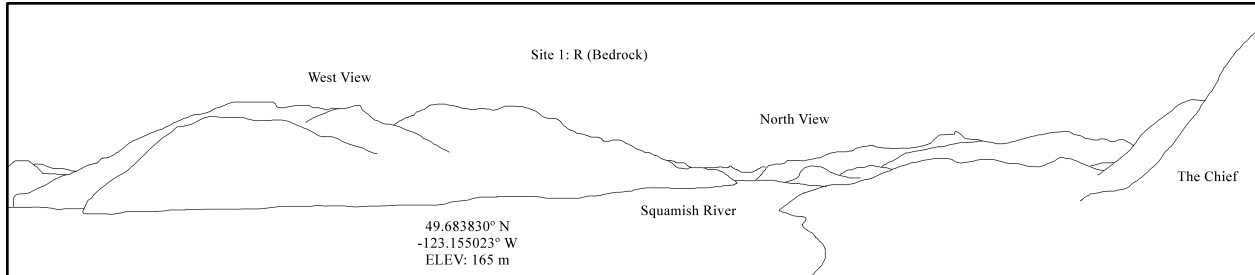


Figure 1: R (Bedrock) north view.

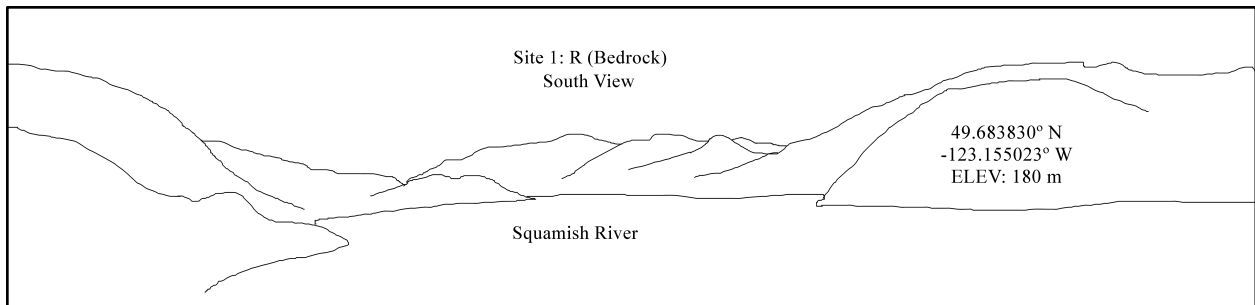


Figure 2: R (Bedrock) south view.

3.2 Site 2

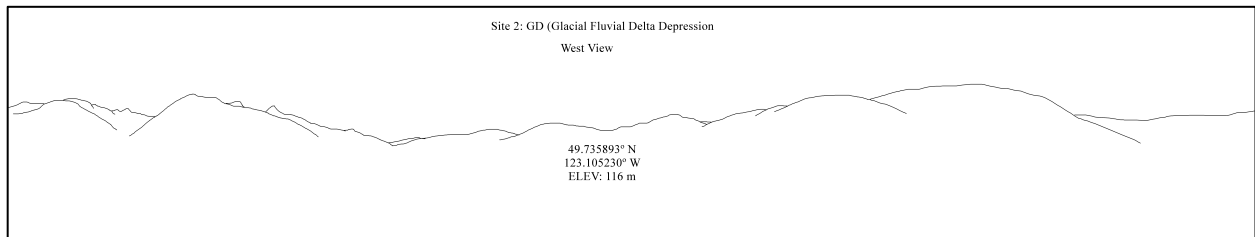


Figure 3: Gd (Glacial Fluvial Delta Depression) west view.

3.3 Site 3



Figure 4: Gh (Glacial Fluvial Hummocky Kettle Kame) north view.

3.4 Site 4

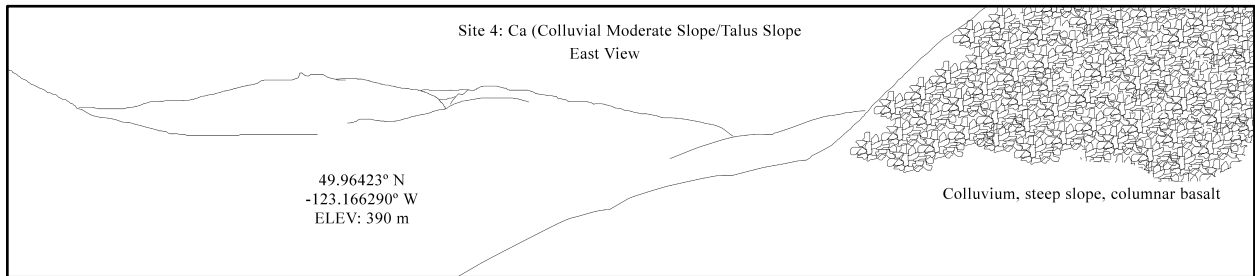


Figure 5: Ca (Colluvial Moderate Slope/ Talus Slope) east view.

3.5 Site 5

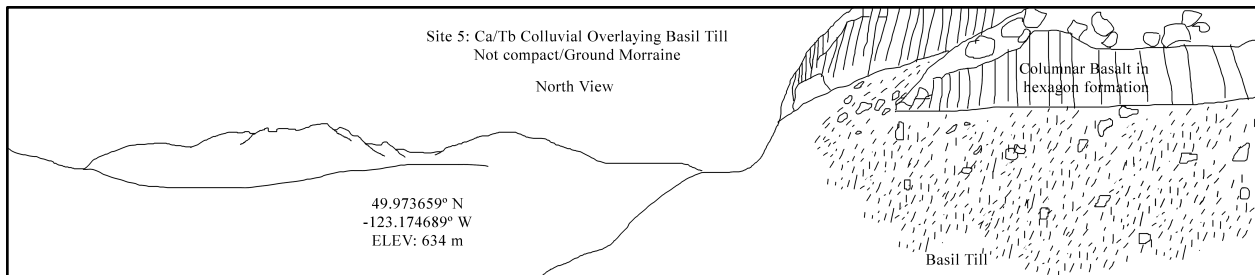


Figure 6: Ca/Tb (Colluvial Overlaying Basil Till Not Compacted/ Ground Moraine) north view.

3.6 Site 6

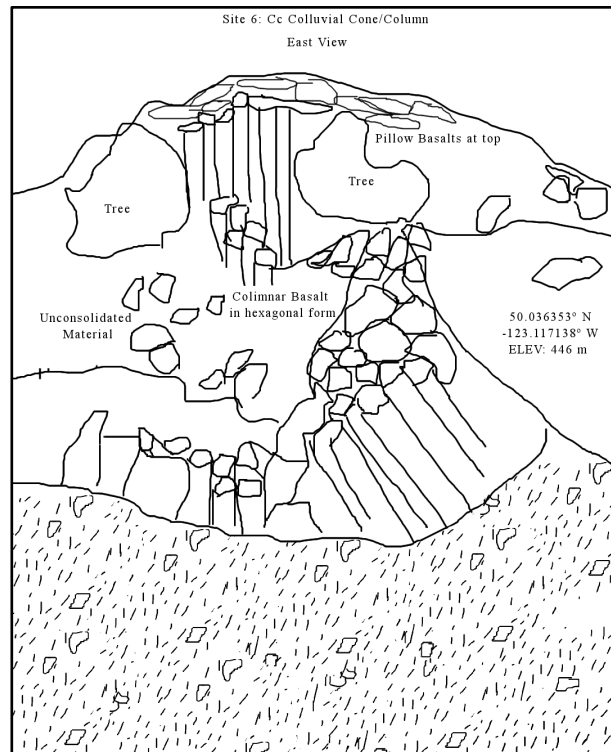


Figure 7: Cc (Colluvial Cone/ Columns) east view.

4| Discussion

Site 1

The chief is an old magma chamber below a volcano near Mt. Garibaldi with new basalt material. There are a lot of U-shaped valleys and moraines to the north. The rounded tops of some slopes at Site 1 clearly show where the Squamish-Cheakamus Glacier rested, as point peaks (Mt. Garibaldi) can also be seen from the site, which indicates that the glacier must have rested below this point. As moraines can be seen to the north, this is evidence that a glacier must have been present to both the North West (Squamish-Cheakamus Glacier) and the North East (Mamquam Glacier). Mass wasting, fluvial process, and chemical and physical weathering transformed the point peaks of the visible mountaintops. Standing on a drumlin, that overlooks the scene in Figure-1, one will notice the striations that have been gouged into the bedrock as the glacier moved over the land. The drumlin displays striations on the north side, with blocky, rougher edges on the other, thus further proving evidence of glacial presence. Staying at Site 1, but moving to a higher elevation (figure 2), it was easy to observe the Southside of the Drumlin that could not be clearly seen from the lower viewpoint. More striations can be viewed again from this higher point on the drumlin. The peaks of the surrounding landscape can also be seen, and depicts how the glacier must have rested slightly below the current snow line on the mountains, as the peaks above have not been smoothed out. Tributary glaciers also helped shape the scenic views by creating hanging valleys, such as the hanging valley located near Shannon falls. Upon

descending the drumlin at site 1, striations and chatter marks could be seen along the bedrock where rocks and sediment that were trapped in the glacial ice could cause scratches. As a result of all the observed characteristics, we have decided that this site represents bedrock that has been shaped by glacial processes, and is our oldest site as it is the farthest south, with our lowest observed elevation, so the glacier must have receded from this area.

Site 2

Evident again from site 2 (figure 3) is the impact that glacial movement has had on the landscape. This location featured a glacial fluvial delta depression, which formed a slightly inclined surface, similar to what would be seen at an alluvial fan. This deposit is made up of sand, gravel, with traces of silt and clay. More sediment sorting can be seen through glacial fluvial processes. The hills at this location show evidence of glacial erosion as they have nice smooth rounded tops. It was determined that this site is 2nd from the oldest as the location of this site is slightly more north of site 1, though both areas were most likely shaped around the same point in time.

Site 3

Site 3 was located within the forest overlooking Stump Lake (Figure 4). It was determined that this site represents glacial fluvial hummocky kettle kame. By observing the surroundings, one immediately notices the densely forested area surrounding Stump Lake. This lake is a kettle lake and was most likely formed as the glacier might have been stagnant or may have left behind glacial ice deposits. The forest ground appears to be hummocky which is caused as a result of glacial till deposits, however evidence of kame can also be seen by the large stones and uneven terrain. Site 3, is clearly 3rd from oldest as the glacier receded up the valley leaving behind ice deposits and kettle-kame, which formed this area.

Site 4

A colluvial moderate slope and talus slope can be seen at site 4 (Figure 5). This site was determined by observing multiple columnar basalt formations that were located along fairly steep slopes. The columns of basalt cooled in hexagonal formation, as this is the quickest and simplest way for basalt to cool. Interestingly, the columns are all of similar size and point into the direction of the lava flow as this represents uniform cooling of the lava once hitting the ice sheet. These lava flows originated from Mt Kayley, which is located to the west of the site. There are two columnar basalt formations at this site, with the lower one in a vertical formation as they formed under the ice sheet, and higher horizontal columns that formed later by cooling on the side of the ice sheet. The different directions of lava flow represent that two lava flows occurred in this location. Seen to the left of the site is "The Barrier" which is a remnant of a lava flow, and has since had multiple mass wastes take place on it's slope causing the formation of debris flows into "rubble creek". As a result of all these characteristics, it was determined that this site is the 4th from the oldest site.

Site 5

Seen at site 5 (figure 6) is colluvial materials overlaying glacial till that has not been compacted. This formation was determined through the observation of columnar basalt, which came from Mt Kayley. This site was of particular interest as it shows vertical lava flow columns above glacial till. This is a result of a glacier receding and depositing till material prior to a lava flow cooling over top of this deposit. Slightly further up at site 5, silt and till could be seen under mass wasting. The mass wasting at this site was mostly likely caused by glacial recession that oversteepened the slopes, thus causing debris flows. The clast at this location displayed very angular edges and was hardly eroded, thus evidence of the lack of glacial presence. Had a glacier been present at this location, one could expect smoother and rounded sediment materials. This site was determined to be the second youngest of the sites visited due to the characteristics described above.

Site 6

Observed at site 6 are colluvial cones and columns (Figure 7). This site is located the farthest north of all the sites visited, and is at a relatively low elevation. We have thus determined this site to be the oldest as the glacier would have receded from this point last and because of its lower elevation, ice might have been present for longer periods of time in the area. The colluvial cones and columns here are a result of lava intruding into ice and being eroded on the edges. Near the top of this site, the lava may have melted the ice in this location forming water, thus causing the lava flow to cool as pillow basalts. However it should be noted that as the glacial ice here shrunk over time, the removal dates of certain materials might not be the same as higher up in the valley.

5| Conclusion

Based on our background knowledge of geomorphology, observation and analysis today, this assignment helps us understand how glaciation formed during the past in the Squamish Valley and the Cheakamus Valley.